

SBN Progress – January 2018

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I. Decrease of Trigger Rate with Time on MicroBooNE

As co-convener of the MicroBooNE trigger group, En-Chuan is studying the decrease of triggered neutrino events with time. As shown in Figure 1, the rate of neutrino events per POT has dropped by about 7.1% since the beginning of 2016. However, no such decrease is observed in the MiniBooNE detector, as shown in Figure 2. At present, this drop in trigger rate appears to be due to a decrease in scintillation light, and the scintillation light trigger threshold has been reduced to compensate for this decrease.

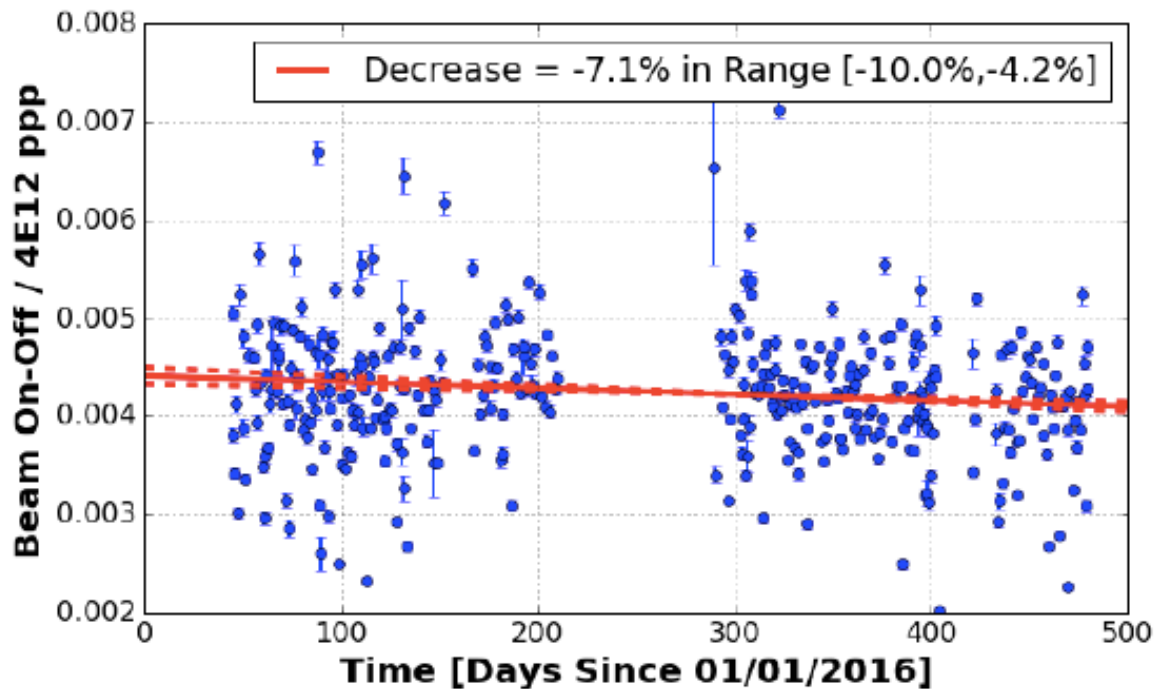


Figure 1: The rate of neutrino events per POT in MicroBooNE has dropped by about 7.1% since the beginning of 2016.

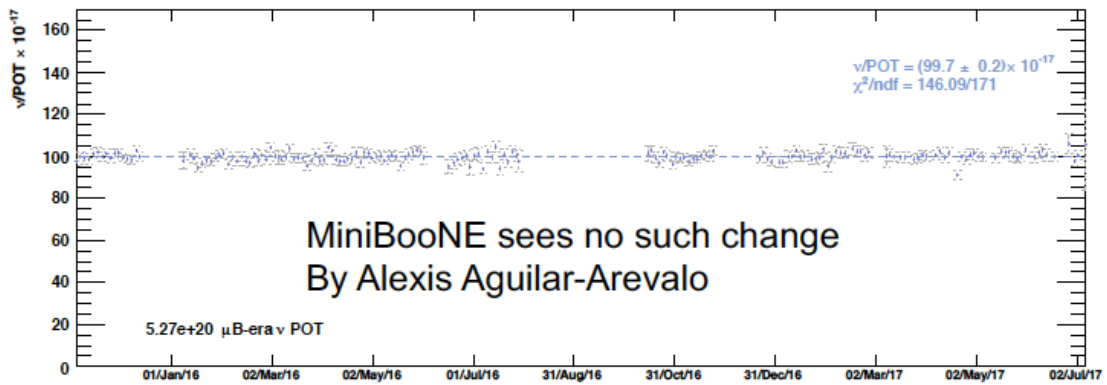


Figure 2: The MiniBooNE detector observes no decrease in the rate of neutrino events per POT since the beginning of 2016.

II. Prototype Assembly of an SBND PDS Module

As shown in Figure 3, a prototype assembly of an SBND Photon Detection System (PDS) module has been completed with a few rejected PMTs installed. This module will be shipped to Fermilab in order to test the mounting of scintillator bars.



Figure 3: A prototype assembly of an SBND Photon Detection System (PDS) module with a few rejected PMTs installed. The module will be shipped to Fermilab in order to test the mounting of scintillator bars.

III. SBND PDS PMT Testing

A PMT that has been coated with TPB has been tested with laser light and appears to work well. Figure 4 shows the response of a coated PMT as a function of laser light (normalized to the number of photoelectrons). The number of photoelectrons observed by the PMT is linear with the laser light. All 144 phototubes will be tested, eight at a time, in a cryostat filled with liquid nitrogen, as shown in Figure 5.

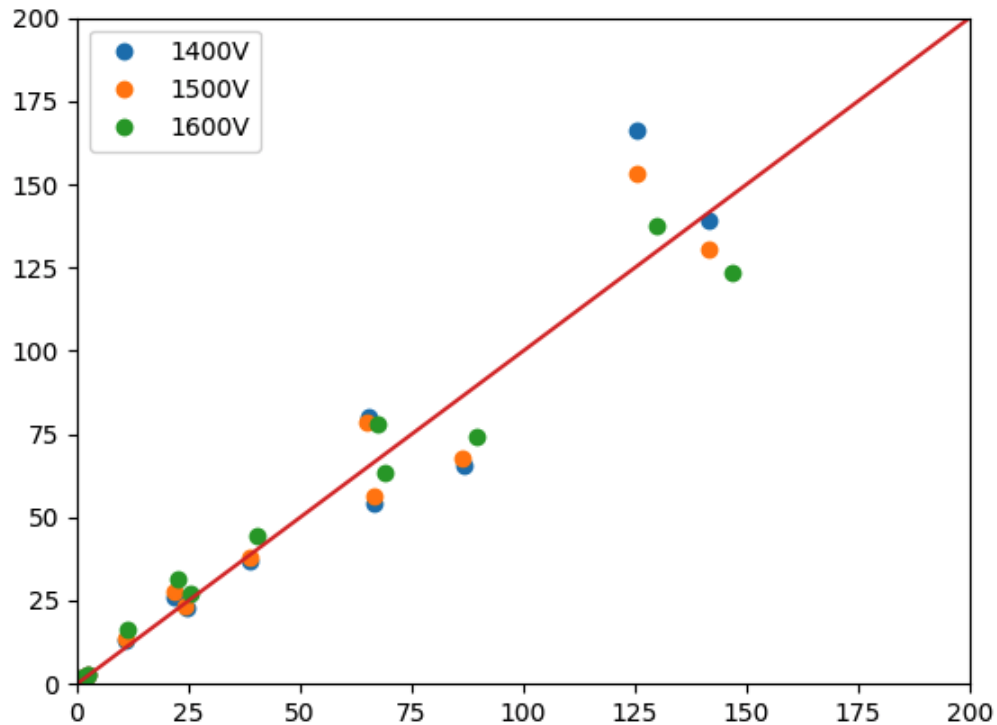


Figure 4: The response of a coated PMT as a function of laser light (normalized to the number of photoelectrons). The number of photoelectrons observed by the PMT is linear with the laser light.



Figure 5: All 144 phototubes will be tested, eight at a time, in a cryostat filled with liquid nitrogen.